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How difficult is it to verify a quantum advantage?

Recent years and month have witnessed significant efforts of realizing a quantum advantage. This terms refers to the successful implementation of a quantum computational task of some sort that outperforms classical supercomputers for the same task. In this talk we will elaborate on the question to what extent and how such a quantum advantage can be certified, a highly challenging task in the light of the fact that a mere classical re-simulation is out of reach.

We will end the talk by elaborating on further perspectives of quantum simulators and near noisy intermediate-scale quantum (NISQ) technology.